WHAT IS CLAIMED IS:

1. An optical pickup unit comprising:

first and second light sources of first and second wavelengths, respectively;

a dichroic element;

a phase plate; and

an objective lens,

wherein one of the first and second light sources is selected so that information recording or reproduction is performed by converging a light beam emitted from the selected one of the first and second light sources on an optical recording medium via said dichroic element, said phase plate, and said objective lens.

2. The optical pickup unit as claimed in claim 1, wherein said dichroic element, said phase plate, and said objective lens are used for both of

light beams emitted from the first and second light sources, respectively.

3. The optical pickup unit as claimed in claim 1, wherein an effective diameter $\phi 1$ of said objective lens, an effective diameter $\phi 2$ of said phase plate, and an effective diameter $\phi 3$ of said dichroic element satisfy $\phi 1 < \phi 2 < \phi 3$.

4. The optical pickup unit as claimed in claim 1, wherein the first light source is a red semiconductor laser;

and the second light source is an infrared semiconductor laser.

5. The optical pickup unit as claimed in

claim 1, said phase plate is formed integrally with another optical component.

6. The optical pickup unit as claimed in claim 1, wherein said phase plate substantially circularly polarizes each of light beams of the first and second wavelengths.

7. The optical pickup unit as claimed in claim 1, wherein said phase plate substantially circularly polarizes one of light beams of the first and second wavelengths and substantially elliptically polarizes another of the light beams of the first and second wavelengths.

8. The optical pickup unit as claimed in

claim 1, wherein said phase plate substantially elliptically polarizes each of light beams of the first and second wavelengths.

9. The optical pickup unit as claimed in claim 1, wherein said phase plate is provided between said dichroic element and said objective lens.

10. The optical pickup unit as claimed in claim 1, wherein the light beam emitted from the selected one of the first and second light sources passes through said dichroic element, said phase plate, and said objective lens in an order described to be converged on the optical recording medium.

11. An optical pickup unit recording

information on or reproducing information from first and second optical recording media of different optical recording formats, the optical pickup unit comprising:

first and second light sources emitting lights of first and second wavelengths to be projected onto the first and second recording media, respectively;

first and second detection parts detecting reflected lights from the first and second recording media, respectively;

a polarization-type light-path splitting part splitting the light emitted from said first light source and a light traveling toward said first detection part;

a non-polarization-type light-path splitting part splitting the light emitted from said second light source and a light traveling toward said second detection part;

a light-path combination part combining light paths of the lights of the first and second wavelengths;

a light-converging part converging the lights of the first and second wavelengths on the first and second optical recording media,

respectively; and

a phase plate provided between said light-path combination part and said light-converging part.

12. The optical pickup unit as claimed in claim 11, wherein said phase plate functions as a 1/4 wave plate to each of the lights of the first and second wavelengths.

13. The optical pickup unit as claimed in claim 11, wherein said phase plate functions as a 1/4 wave plate to the light of the first wavelength and causes a level of noise generated by a returning light to be equal to or below a predetermined allowable level with respect to the light of the second wavelength.

14. The optical pickup unit as claimed in claim 11, wherein said phase plate is formed integrally with said light-path combination part.

15. An optical pickup unit recording information on or reproducing information from first and second optical recording media of different optical recording formats, the optical pickup unit comprising:

first and second light sources emitting lights of first and second wavelengths to be projected onto the first and second recording media, respectively;

first and second detection parts detecting reflected lights from the first and second recording media, respectively;

a first non-polarization-type light-path splitting part splitting the light emitted from said first light source and a light traveling toward said first detection part;

a second non-polarization-type light-path splitting part splitting the light emitted from said

second light source and a light traveling toward said second detection part;

a light-path combination part combining light paths of the lights of the first and second wavelengths;

a light-converging part converging the lights of the first and second wavelengths on the first and second optical recording media, respectively; and

a phase plate provided between said light path combination part and said light-converging part.

16. The optical pickup unit as claimed in claim 15, wherein said phase plate functions as a 1/4 wave plate to each of the lights of the first and second wavelengths.

17. The optical pickup unit as claimed in claim 15, wherein said phase plate causes a level of

noise generated by a returning light to be equal to or below a predetermined allowable level with respect to each of the lights of the first and second wavelengths.

18. The optical pickup unit as claimed in claim 15, wherein said phase plate is formed integrally with said light-path combination part.

19. An optical pickup unit recording information on or reproducing information from first and second optical recording media of different optical recording formats, the optical pickup unit comprising:

first and second light sources emitting lights of first and second wavelengths to be projected onto the first and second recording media, respectively;

first and second detection parts detecting

reflected lights from the first and second recording media, respectively;

a non-polarization-type light-path splitting part splitting the light emitted from said first light source and the reflected light from the first optical recording medium and splitting the light emitted from said second light source and the reflected light from the second optical recording medium;

a light-converging part converging the lights of the first and second wavelengths on the first and second optical recording media, respectively; and

a phase plate provided between said non-polarization-type light-path splitting part and said light-converging part.

20. The optical pickup unit as claimed in claim 19, wherein said phase plate functions as a 1/4 wave plate to each of the lights of the first and second wavelengths.

21. The optical pickup unit as claimed in claim 19, wherein said phase plate causes a level of noise generated by a returning light to be equal to or below a predetermined allowable level with respect to each of the lights of the first and second wavelengths.

22. The optical pickup unit as claimed in claim 19, wherein said first and second light sources, said first and second detection parts, said non-polarization-type light-path splitting part, and said phase plate are provided in a single package.

23. An optical element comprising:

a broadband 1/4 wave plate part providing a phase difference of a 1/4 wavelength to each of light beams of a plurality of specific wavelengths;

a total reflection part reflecting all of the light beams of the specific wavelengths;

wherein a light beam incident on the optical element is affected twice by said broadband 1/4 wave plate part before being emitted from the optical element by being first affected by said broadband 1/4 wave plate part, then reflected from said total reflection part, and again incident on said broadband 1/4 wave plate part to be affected thereby; and

said broadband 1/4 wave plate part has a multilayer organic film structure formed to be capable of providing the phase difference of the 1/4 wavelength to each of the light beams of the specific wavelengths by selecting and layering one over another a plurality of organic films of different wavelength dispersion characteristics so that wavelength dispersion of each of the organic films is compensated for, the wavelength dispersion characteristics each representing wavelength dependency of a phase difference.

24. An optical element comprising:

a 1/4 wave plate part having a function of providing a phase difference of a 1/4 wavelength only

to at least part of light beams of a plurality of specific wavelengths and a function of providing a given phase difference other than the 1/4 wavelength to remaining light beams; and

a total reflection part reflecting all of the light beams,

wherein a light beam incident on the optical element is affected twice by said 1/4 wave plate part before being emitted from the optical element by being first affected by said 1/4 wave plate part, then reflected from said total reflection part, and again incident on said 1/4 wave plate part to be affected thereby.

25. An optical element comprising:

a wavelength selection and reflection part reflecting part of light beams of a plurality of specific wavelengths and transmitting remaining light beams;

a 1/4 wave plate part providing a phase difference of a 1/4 wavelength to the remaining light beams; and

a total reflection part reflecting at least the remaining light beams,

wherein a light beam incident on the optical element and transmitted by said wavelength selection and reflection part is affected by said 1/4 wave plate part, reflected from said total reflection part, incident again on said 1/4 wave plate part to be affected thereby, and passes through said wavelength election and reflection part to be emitted from the optical element.

26. An optical pickup unit including a function of recording information on or reproducing information from an optical recording medium, the optical pickup unit comprising:

a plurality of semiconductor lasers each capable of emitting a light beam of a specific wavelength;

an optical part including a coupling lens and an objective lens to direct the light beam emitted from each of said semiconductor lasers to a recording surface of the optical recording medium,

the objective lens converging the light beam on the recording surface;

a light-receiving element receiving the light beam reflected and returning from the recording surface; and

an optical element provided in a light path between the objective lens and the coupling lens, the optical element comprising:

a broadband 1/4 wave plate part providing a phase difference of a 1/4 wavelength to each of the light beams of the specific wavelengths; and

a total reflection part reflecting all of the light beams of the specific wavelengths.

27. The optical pickup unit as claimed in claim 26, wherein said broadband 1/4 wave plate part comprises a multilayer organic film formed of a plurality of layered organic films.

28. The optical pickup unit as claimed in claim 27, wherein said multilayer organic film is formed to be capable of providing the phase difference of the 1/4 wavelength to each of the light beams of the specific wavelengths by selecting and layering one over another a plurality of organic films of different wavelength dispersion characteristics so that wavelength dispersion of each of the organic films is compensated for, the wavelength dispersion characteristics each representing wavelength dependency of a phase difference.

29. The optical pickup unit as claimed in claim 27, wherein each of the organic films is formed of polycarbonate, polyvinyl alcohol, or polymethyl methacrylate.

30. The optical pickup unit as claimed in

claim 26, wherein said optical element comprises a beam-shaping part shaping an incident light beam.

31. The optical pickup unit as claimed in claim 30, wherein said optical element is arranged so that a normal line of a surface of said optical element on which surface the light beam is incident is inclined at an angle smaller than 45° to an optical axis of the objective lens.

32. The optical pickup unit as claimed in claim 30, wherein at least said semiconductor lasers are provided in a single package; and

said optical element makes an optical axis of each of the light beams of the specific wavelengths emitted from said optical element parallel to an optical axis of the objective lens.

33. The optical pickup unit as claimed in claim 26, wherein said optical element has at least a surface perpendicular to an optical axis of the objective lens.

34. The optical pickup unit as claimed in claim 26, wherein said optical element is provided in a light path between the objective lens and a mirror driven together with the objective lens.

35. The optical pickup unit as claimed in claim 26, wherein the specific wavelengths are 650 and 780 nm.

36. An optical pickup unit including a function of recording information on or reproducing

information from an optical recording medium, the optical pickup unit comprising:

a plurality of semiconductor lasers each capable of emitting a light beam of a specific wavelength;

an optical part including a coupling lens and an objective lens to direct the light beam emitted from each of said semiconductor lasers to a recording surface of the optical recording medium, the objective lens converging the light beam on the recording surface;

a light-receiving element receiving the light beam reflected and returning from the recording surface; and

an optical element provided in a light path between the objective lens and the coupling lens, the optical element comprising:

a broadband 1/4 wave plate part having a function of providing a phase difference of a 1/4 wavelength only to at least part of the light beams of the specific wavelengths and a function of providing a given phase difference other than the 1/4 wavelength to remaining light beams; and

a total reflection part reflecting all of the light beams of the specific wavelengths.

37. The optical pickup unit as claimed in claim 36, wherein the part of the light beams provided with the phase difference of the 1/4 wavelength includes one or more than one of the light beams of a shortest one or shortest ones of the specific wavelengths.

38. The optical pickup unit as claimed in claim 36, wherein the broadband 1/4 wave plate part provides the phase difference of the 1/4 wavelength to one or more than one of the light beams on a shorter wavelength side.

39. The optical pickup unit as claimed in claim 36, wherein said optical element comprises a beam-shaping part shaping an incident light beam.

40. The optical pickup unit as claimed in claim 39, wherein said optical element is arranged so that a normal line of a surface of said optical element on which surface the light beam is incident is inclined at an angle smaller than 45° to an optical axis of the objective lens.

41. The optical pickup unit as claimed in claim 39, wherein at least said semiconductor lasers are provided in a single package; and

said optical element makes an optical axis of each of the light beams of the specific wavelengths emitted from said optical element parallel to an optical axis of the objective lens.

42. The optical pickup unit as claimed in claim 36, wherein said optical element has at least a surface perpendicular to an optical axis of the objective lens.

43. The optical pickup unit as claimed in claim 36, wherein said optical element is provided in a light path between the objective lens and a mirror driven together with the objective lens.

44. The optical pickup unit as claimed in claim 36, wherein the specific wavelengths are 650 and 780 nm.

45. An optical pickup unit including a function of recording information on or reproducing information from an optical recording medium, the optical pickup unit comprising:

a plurality of semiconductor lasers each capable of emitting a light beam of a specific wavelength;

an optical part including a coupling lens and an objective lens to direct the light beam emitted from each of said semiconductor lasers to a

recording surface of the optical recording medium, the objective lens converging the light beam on the recording surface;

a light-receiving element receiving the light beam reflected and returning from the recording surface; and

an optical element provided in a light path between the objective lens and the coupling lens, the optical element comprising:

a wavelength selection and reflection part reflecting part of the light beams of the specific wavelengths and transmitting remaining light beams;

a broadband 1/4 wave plate part providing a phase difference of a 1/4 wavelength to the remaining light beams transmitted by said wavelength selection and reflection part; and

a total reflection part reflecting all of the light beams of the specific wavelengths.

46. The optical pickup unit as claimed in claim 45, wherein the remaining light beams provided

with the phase difference of the 1/4 wavelength includes one or more than one of the light beams of a shortest one or shortest ones of the specific wavelengths.

47. The optical pickup unit as claimed in claim 45, wherein the 1/4 wave plate part provides the phase difference of the 1/4 wavelength to one or more than one of the light beams on a shorter wavelength side.

48. The optical pickup unit as claimed in claim 45, wherein said optical element comprises a beam-shaping part shaping an incident light beam.

49. The optical pickup unit as claimed in

claim 48, wherein said optical element is arranged so that a normal line of a surface of said optical element on which surface the light beam is incident is inclined at an angle smaller than 45° to an optical axis of the objective lens.

50. The optical pickup unit as claimed in claim 48, wherein at least said semiconductor lasers are provided in a single package; and

said optical element makes an optical axis of each of the light beams of the specific wavelengths emitted from said optical element parallel to an optical axis of the objective lens.

51. The optical pickup unit as claimed in claim 45, wherein said optical element has at least a surface perpendicular to an optical axis of the objective lens.

52. The optical pickup unit as claimed in claim 45, wherein said optical element is provided in a light path between the objective lens and a mirror driven together with the objective lens.

53. The optical pickup unit as claimed in claim 45, wherein the specific wavelengths are 650 and 780 nm.

54. An optical disk drive unit comprising:

an optical pickup unit including a function of recording information on or reproducing information from an optical recording medium, the optical pickup unit comprising:

a plurality of semiconductor lasers each capable of emitting a light beam of a specific wavelength;

an optical part including a coupling lens and an objective lens to direct the light beam

emitted from each of said semiconductor lasers to a recording surface of the optical recording medium, the objective lens converging the light beam on the recording surface;

a light-receiving element receiving the light beam reflected and returning from the recording surface; and

an optical element provided in a light path between the objective lens and the coupling lens, the optical element comprising:

a broadband 1/4 wave plate part providing a phase difference of a 1/4 wavelength to each of the light beams of the specific wavelengths; and

a total reflection part reflecting all of the light beams of the specific wavelengths.

55. The optical disk drive unit as claimed in claim 54, wherein said broadband 1/4 wave plate part comprises a multilayer organic film formed of a plurality of layered organic films.

56. The optical disk drive unit as claimed in claim 55, wherein said multilayer organic film is formed to be capable of providing the phase difference of the 1/4 wavelength to each of the light beams of the specific wavelengths by selecting and layering one over another a plurality of organic films of different wavelength dispersion characteristics so that wavelength dispersion of each of the organic films is compensated for, the wavelength dispersion characteristics each representing wavelength dependency of a phase difference.

57. The optical disk drive unit as claimed in claim 55, wherein each of the organic films is formed of polycarbonate, polyvinyl alcohol, or polymethyl methacrylate.

58. The optical disk drive unit as claimed

in claim 54, wherein said optical element comprises a beam-shaping part shaping an incident light beam.

59. The optical disk drive unit as claimed in claim 58, wherein said optical element is arranged so that a normal line of a surface of said optical element on which surface the light beam is incident is inclined at an angle smaller than 45° to an optical axis of the objective lens.

60. The optical disk drive unit as claimed in claim 58, wherein at least said semiconductor lasers are provided in a single package; and

said optical element makes an optical axis of each of the light beams of the specific wavelengths emitted from said optical element parallel to an optical axis of the objective lens.

61. The optical disk drive unit as claimed in claim 54, wherein said optical element has at least a surface perpendicular to an optical axis of the objective lens.

62. The optical disk drive unit as claimed in claim 54, wherein said optical element is provided in a light path between the objective lens and a mirror driven together with the objective lens.

63. The optical disk drive unit as claimed in claim 54, wherein the specific wavelengths are 650 and 780 nm.

64. An optical disk drive unit comprising:

an optical pickup unit including a function

of recording information on or reproducing information from an optical recording medium, the optical pickup unit comprising:

a plurality of semiconductor lasers each capable of emitting a light beam of a specific wavelength;

an optical part including a coupling lens and an objective lens to direct the light beam emitted from each of said semiconductor lasers to a recording surface of the optical recording medium, the objective lens converging the light beam on the recording surface;

a light-receiving element receiving the light beam reflected and returning from the recording surface; and

an optical element provided in a light path between the objective lens and the coupling lens, the optical element comprising:

a broadband 1/4 wave plate part having a function of providing a phase difference of a 1/4 wavelength only to at least part of the light beams of the specific wavelengths and a function of providing a given phase difference other than the 1/4 wavelength to remaining light beams; and

a total reflection part reflecting

all of the light beams of the specific wavelengths.

65. The optical disk drive unit as claimed in claim 64, wherein the part of the light beams provided with the phase difference of the 1/4 wavelength includes one or more than one of the light beams of a shortest one or shortest ones of the specific wavelengths.

66. The optical disk drive unit as claimed in claim 64, wherein the 1/4 wave plate part provides the phase difference of the 1/4 wavelength to one or more than one of the light beams on a shorter wavelength side.

67. The optical disk drive unit as claimed

in claim 64, wherein said optical element comprises a beam-shaping part shaping an incident light beam.

68. The optical disk drive unit as claimed in claim 67, wherein said optical element is arranged so that a normal line of a surface of said optical element on which surface the light beam is incident is inclined at an angle smaller than 45° to an optical axis of the objective lens.

69. The optical disk drive unit as claimed in claim 67, wherein at least said semiconductor lasers are provided in a single package; and

said optical element makes an optical axis of each of the light beams of the specific wavelengths emitted from said optical element parallel to an optical axis of the objective lens.

70. The optical disk drive unit as claimed in claim 64, wherein said optical element has at least a surface perpendicular to an optical axis of the objective lens.

71. The optical disk drive unit as claimed in claim 64, wherein said optical element is provided in a light path between the objective lens and a mirror driven together with the objective lens.

72. The optical disk drive unit as claimed in claim 64, wherein the specific wavelengths are 650 and 780 nm.

73. An optical disk drive unit comprising:

an optical pickup unit including a function

of recording information on or reproducing information from an optical recording medium, the optical pickup unit comprising:

a plurality of semiconductor lasers each capable of emitting a light beam of a specific wavelength;

an optical part including a coupling lens and an objective lens to direct the light beam emitted from each of said semiconductor lasers to a recording surface of the optical recording medium, the objective lens converging the light beam on the recording surface;

a light-receiving element receiving the light beam reflected and returning from the recording surface; and

an optical element provided in a light path between the objective lens and the coupling lens, the optical element comprising:

a wavelength selection and reflection part reflecting part of the light beams of the specific wavelengths and transmitting remaining light beams;

a broadband 1/4 wave plate part providing a phase difference of a 1/4 wavelength to the remaining light beams transmitted by said

wavelength selection and reflection part; and

a total reflection part reflecting all of the light beams of the specific wavelengths.

74. The optical disk drive unit as claimed in claim 73, wherein the remaining light beams provided with the phase difference of the 1/4 wavelength includes one or more than one of the light beams of a shortest one or shortest ones of the specific wavelengths.

75. The optical disk drive unit as claimed in claim 73, wherein the 1/4 wave plate part provides the phase difference of the 1/4 wavelength to one or more than one of the light beams on a shorter wavelength side.

76. The optical disk drive unit as claimed in claim 73, wherein said optical element comprises a beam-shaping part shaping an incident light beam.

77. The optical disk drive unit as claimed in claim 76, wherein said optical element is arranged so that a normal line of a surface of said optical element on which surface the light beam is incident is inclined at an angle smaller than 45° to an optical axis of the objective lens.

78. The optical disk drive unit as claimed in claim 76, wherein at least said semiconductor lasers are provided in a single package; and

said optical element makes an optical axis of each of the light beams of the specific wavelengths emitted from said optical element parallel to an optical axis of the objective lens.

79. The optical disk drive unit as claimed in claim 73, wherein said optical element has at least a surface perpendicular to an optical axis of the objective lens.

80. The optical disk drive unit as claimed in claim 73, wherein said optical element is provided in a light path between the objective lens and a mirror driven together with the objective lens.

81. The optical disk drive unit as claimed in claim 73, wherein the specific wavelengths are 650 and 780 nm.